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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,966	12/14/2001	Songgang Qiu	ST22-031	7292
21567	7590	12/17/2003	EXAMINER	
WELLS ST. JOHN P.S.			JONES, JUDSON	
601 W. FIRST AVENUE, SUITE 1300			ART UNIT	
SPOKANE, WA 99201			PAPER NUMBER	
			2834	

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

10

Office Action Summary	Application No.	Applicant(s)	
	10/016,966	QIU ET AL.	
	Examiner	Art Unit	
	Judson H Jones	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-39 is/are allowed.
- 6) ☒ Claim(s) 19,25,26,41,42 and 46 is/are rejected.
- 7) ☒ Claim(s) 20-24,40 and 43-45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

In response to applicant's argument that Dieterle et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Dieterle et al. and Champion are both motors, both deal with the problem of vibration in motors and both are concerned with feedback control circuits. Applicant states, "The present invention is from the field of endeavor for vibration reduction of linear reciprocating machines." What Applicant wants to do here is to make every general teaching about dynamoelectric machines nonanalogous art, to make every teaching about linear machines that don't reciprocate nonanalogous art and to even make every teaching from linear reciprocating machines that are not concerned with vibration reduction into nonanalogous art. In Applicant's view, there is one and only one problem being addressed by Applicant. However, in designing a motor, there are always several problems to be addressed. One problem faced by Applicant in designing his motor was whether to use analog or digital control signals. That problem was common to rotary, reciprocating and linear motors. Applicant quoted the relevant portion of Clay, "A reference is reasonably pertinent if . . . it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." Applicant's own specification on page 27 acknowledges that general control system teachings are relevant to the instant invention by citing two text books. However, a new reference, Livingstone et al., is being used in place of Dieterle et al. Livingstone et al. is in the field of cryogenic refrigerators. Cryogenic refrigerators include

Stirling refrigerators as described by Livingstone et al. in column 1 line 11-13. While the main thrust of the Livingstone et al. patent does not involve vibration reduction, Livingstone does mention vibration in the abstract, in column 4 lines 3-26 and in claim 7, lines 4 and 5.

The request by Applicant's representative for a telephone interview if the next office action (i.e., this office action) was anything other than a notice of allowance is noted. See page 15 of Applicant's response of 10/07/03. However, since this office action uses references that Applicant's representative has never seen combined with new arguments, a telephone interview would not be useful until Applicant's representative has seen the references and considered the arguments. At that time Applicant's representative may call and schedule a telephone interview.

Claim Objections

Claim 40 is objected to because of the following informalities: the phrase "and operative to generate a vibration force generated by the axially reciprocating machine" is unclear. From the placement of the phrase in the sentence, this could mean the vibration force detector is operative to generate a vibrational force. See the specification page 46 paragraph 0139 where Applicant states the actuator will produce a force equal to the vibrational level. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Champion et al. 5,836,165 A (cited by Applicant) in view of Livingstone 5,018,357 A. Champion et al. discloses the active vibration control system with a housing, a linear actuator comprising piston 8 and the

signal generator, servo and motor drive associated with the piston and discloses a counterbalance mass 10 as described in column 45-49 with a linear actuator comprising the signal generator, servo and motor drive associated with mass 10 but does not disclose using analog control circuitry. In column 7 lines 18-23 Champion et al. teaches using a microprocessor (i.e., a digital computer). Livingstone et al. teaches in column 8 lines 13-32 that analog control circuits can be used in place of digital controls, computers and computer programs and vice versa. Since Livingstone et al. and Champion et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized analog control circuitry in a active vibration control system in order to reduce the cost of the device by omitting a microprocessor, analog to digital converters and software programs for analyzing the feedback signals and developing control signals.

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Champion et al. as modified by Livingstone et al. as applied to claim 19 above, and further in view of Nakanishi et al. 5,117,642 A. Champion et al. as modified by Livingstone et al. discloses the vibration control system but does not disclose using fast Fourier transforms to detect vibration frequencies. Nakanishi et al. teaches the usefulness of fast Fourier transforms in column 9-32 for use in vibration reduction and noise reduction in a rotary compressor for a refrigerator. Since Nakanishi et al. and Champion et al. as modified by Livingstone et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized fast Fourier transforms to improve the control of vibrations.

Claims 41, 42 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funatsu et al. 6,079,960 A in view of Champion et al. Funatsu et al. discloses first and second reciprocating machines 2a, 2b operating in synchronized opposed directions as described in column 1-22 but does not disclose a vibration control system for the first and second reciprocating machines. Champion et al. teaches a vibration control system for back to back compressor pistons in a Stirling cycle engine. Since Champion et al. and Funatsu et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the vibration control system of Champion et al. in the Funatsu et al. device in order to reduce undesirable vibrations.

In regard to claim 42, tune is defined as “to adjust for precise functioning” in Merriam Webster's Collegiate Dictionary Tenth Edition copyright 1997. See Champion et al. column 3 lines 34-44 for an explanation of how Champion et al. tunes the piston drive forces to reduce vibration.

In regard to claim 46, see Champion et al. figure 1 element 22 for the vibration detector and see element 20 for the vibration controller.

Allowable Subject Matter

Claims 27-39 are allowed.

Claims 20-24 and 43-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 40 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach analog control circuitry for an active vibration control system where the control circuitry comprises voltage divider circuitry as recited in claim 20. The prior art of record does not disclose or teach first and second tuning circuits for first and second axially reciprocating machines that operate in synchronized opposed directions as recited in claims 27 and 36. Champion et al. 5,836,165 A (of record) discloses first and second axially reciprocating machines that operate in synchronized opposed directions but discloses only a single tuning circuit that tunes one of the machines. The prior art of record does not disclose or teach a control system having an analog control circuitry cooperating with a FFT analyzer as part of a control system for generating a vibrational force as recited in claim 40. The prior art of record does not disclose or teach second tuning circuitry associated with the second axially reciprocating machine in combination with the other features of claim 43. The prior art of record does not disclose or teach a first tuning circuit comprising a first tuning capacitor in combination with the other features of claim 45.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

Application/Control Number: 10/016,966

Page 7

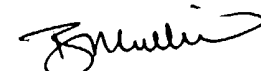
Art Unit: 2834

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Burt Mullins can be reached on 703-305-7063. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



JHJ 12/04/2003



BURTON S. MULLINS
PRIMARY EXAMINER